

## Safety Evaluation Plan

### Surface Water Monitoring Requirements

#### 5.7.9.3.5 Operational Surface Water Monitoring

During ISR operations, 24 impoundments and 10 stream sampling sites, depicted on Exhibit 5.7-I, will be monitored as part of the operational monitoring program (Powertech, 2011a). As described in SER Section 2.4, the applicant sampled 11 impoundments and 8 stream locations within and surrounding the project area. Table 5.7-4 is the list of impoundments and stream locations sampled during the preoperational baseline sampling.

Powertech sampled 8 stream locations within and surrounding the project area.

Table 5.7-4 is the list of impoundments and stream locations sampled during the preoperational baseline sampling.

From Table 5.7-4

Stream Sampling Locations			
BVC01	989871	428716	Beaver Creek downstream
BVC04	965366	460922	Beaver Creek upstream
CHR01	985098	423010	Cheyenne River upstream
CHR05	1015626	405925	Cheyenne River downstream
PSC01	996764	436205	Pass Creek downstream
PSC02	1002722	452563	Pass Creek upstream
BEN01	1015872	416196	Bennett Canyon
UNT01	1007565	422482	Unnamed Tributary

Since the preoperational sampling phase, the applicant has added 13 more impoundments and 2 more stream sampling points to its operational surface water monitoring program. SER Table 5.7-5 presents a list of these additional sites, and SER Exhibit 5.7-1 presents the site locations (Powertech, 2011a).

**Table 5.7-5: Additional Operational Surface Water Sampling Locations**

Site ID	Distance from CPP (m/ft)
Sub 32	1,572/5,156 Southeast
Sub 33	1,000/3,281 Southeast
Sub 34	314/1,031 Southwest
Sub 35	1,486/4,875 Southwest
Sub 40	1,229/4,031 West
Sub 49	1,201/3,938 West
Sub 50	1,486/4,875 West
Stream Samples	
BVC11	Beaver Creek downstream
BVC14	Beaver Creek upstream
PSC11	Pass Creek downstream
PSC12	Pass Creek upstream
UNT02	Unnamed Tributary
UNT03	Unnamed Tributary

**Table 2.5-2: Preoperational Surface Water Monitoring Parameters**

<b>Biological</b>	<b>Dissolved Metals</b>	<b>Radionuclides (cont'd)</b>
Bacteria, Fecal Coliform	Aluminum	Gross Alpha – Total
	Arsenic	Gross Beta – Total
<b>Major Anions</b>	Barium	Gross Gamma - Total
Bicarbonate	Boron	
Carbonate	Cadmium	<b>Total Metals</b>
Sulfate	Chromium	Aluminum
Chloride	Copper	Arsenic
Fluoride	Iron	Barium
Nitrate as N	Lead	Boron
	Manganese	Cadmium
<b>Major Cations</b>	Mercury	Calcium
Ammonia as N	Molybdenum	Chromium
Sodium – Dissolved	Nickel	Chromium-III
Calcium – Dissolved	Selenium	Chromium-VI
Magnesium – Dissolved	Selenium-IV	Copper
Potassium – Dissolved	Selenium-VI	Iron
Silica – Dissolved	Silver	Lead
	Thorium-232	Magnesium
<b>General Water Quality</b>	Uranium	Manganese
Alkalinity – Total as CaCO <sub>3</sub>	Vanadium	Mercury
Anion/Cation Balance	Zinc	Molybdenum
Conductivity		Nickel
pH	<b>Suspended Metals</b>	Potassium
Sodium Adsorption Ratio	Thorium 232	Selenium
Total Dissolved Solids (TDS)	Uranium	Selenium-IV
TDS Calculated		Selenium-VI
TDS Balance	<b>Radionuclides</b>	Silica
Solids - Suspended Sediment	Lead 210 – Dissolved	Silver
Total Suspended Solids (TSS)	Lead 210 – Suspended	Sodium
	Lead 210 – Total	Thorium-232
	Polonium 210 – Dissolved	Uranium
	Polonium 210 – Suspended	Vanadium
	Polonium 210 – Total	Zinc

	Radium 226 – Dissolved	
	Radium 226 – Suspended	
	Radium 226 – Total	
	Thorium 230 – Dissolved	
	Thorium 230 – Suspended	
	Thorium 230 – Total	

Source: (Powertech, 2009c)

**Table 2.5-3: Surface Water Constituent Observations**

Sample No.	Location	Observations
Sub01	Stock Pond	U and Ra-226 concentrations below MCLs Gross alpha mean below MCLs, 1 sample above Toxic metals either ND or below MCLs
Sub02	Triangle Mine Pit	Impacted by mining operations Elevated TDS and conductivity Elevated uranium and gross alpha and beta Elevated calcium and magnesium Elevated sulfate
Sub03	Mine Dam	Elevated conductivity Slightly elevated TDS and calcium Elevated manganese Elevated Ra-226 and gross alpha, beta, and gamma pH is acidic
Sub04	Stock Pond	Elevated conductivity, sulfate, and calcium pH is acidic Elevated TDS, manganese Slightly elevated Ra-226
Sub06	Darrow Mine Pit	Impacted by mining operations Elevated conductivity, calcium, chloride Elevated sulfate and TDS Manganese, uranium, TDS, aluminum exceed MCLs or secondary MCLs

Sample No.	Location	Observations
		Elevated Zinc and gross alpha, beta, gamma pH is acidic
Sub07	Stock Dam	Elevated conductivity, calcium, sulfate, TDS pH is acidic Manganese exceeds MCL
Sub08	Stock Pond	Elevated conductivity, sulfate, TDS
Sub09	Stock Pond	U and Ra-226 concentrations below MCLs Gross alpha mean below MCLs, 1 sample above Toxic metals either ND or below MCLs
Sub10	Stock Pond	Elevated conductivity, sulfate, calcium Elevated sodium
Sub11	Stock Pond	Elevated thorium-230 and gross gamma (possibly caused by outlier)
Sub24	Stock Pond	Elevated conductivity, TDS Elevated sulfate, sodium, and calcium
BVC01	Beaver Creek – downstream	Elevated conductivity, sulfate, TDS Elevated calcium, sodium, gross gamma Slightly elevated thorium-230
BVC04	Beaver Creek – upstream	Elevated conductivity, TDS, sulfate Elevated calcium, sodium, chloride Elevated lead-210, gross gamma
CHR01	Cheyenne River – upstream	Elevated conductivity, TDS, sulfate Elevated calcium, sodium, chloride Slightly elevated thorium-230, gross gamma, uranium
CHR02	Cheyenne River – downstream	Elevated conductivity, TDS, sulfate Elevated calcium, sodium, chloride Elevated lead-210, slightly elevated gross gamma
PSC01	Pass Creek – downstream	Elevated fecal coliform Elevated conductivity, TDS, sulfate
PSC02	Pass Creek – upstream	Elevated fecal coliform Elevated conductivity, TDS, sulfate
BEN01	Bennett Canyon	Dry – Automated sampler used, but no samples collected
UNT01	Unnamed Tributary	Slightly elevated gross gamma

Source: (Powertech, 2011a)

The operational surface water monitoring network is discussed in greater detail in SER Section 5.7.9.